The Builder.

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AFTER several years of continuous labour, Mr. Edward Cresy has produced his *Encyclopædia of Civil Engineering*,—an enormous book, containing 1,655 closely printed pages and 3,000 illustrations: and though, as might be expected, we have not yet been able fully to master its multifarious contents, we feel it to be our duty to bring it immediately before the public, and to bespeak for it that favourable consideration to which it is eminently entitled.* The labour bestowed upon it must have been immense; such a mass of information upon the subject has never before been put together in this country; and the variety and extent of knowledge shewn in it are very great.

Reviewers, we respectfully suggest, should approach a work of this description with something like solicitude; and knowing what time, energy, thought, and capital, it represents, should pause before expressing a depreciatory opinion, at all events to ask themselves if they have really seen the whole scope of the book; and if its defects or shortcomings are greater than the difficulties of the undertaking would excuse? It is not long since a similarly laborious work was "phooh, phooh'd," and abused, by writers who had evidently given to its consideration fewer hours than it had cost its author years, for two or three obvious weaknesses, without the slightest commendation for its general value and the much greater number of excellencies it exhibited. Such injustice must be painful to every conscientious mind, and injurious to the best interests of science and literature. We sincerely hope, without any personal motive to influence us in the wish, that the work now before us will receive different treatment.

Before setting forth the contents and arrangement of the book, we feel bound to remark as to the title, that it ought to have been "An Encyclopædia for Civil Engineers and *Architects*," for unquestionably the greater part of that which it treats of comes specially within the province of the latter: and there is nothing in it which they are not bound to study.

Our readers know that we do not regard with favour the separation of the science and art of architecture: it is neglect of the former which has placed architects where they now are. "Science and art," says Mr. Cresy, "are too often considered to have no reference to each other, and hence the principles of construction have been fostered by the Institute of Civil Engineers, whilst what relates to taste and fancy has been considered the province of the Royal Academy.

"The future historian of Britain will not refer to her architectural remains, but to the vast works of the engineer, by which to judge of the habits and civilization of the age. The architect is too generally confined to the pencil, in other words to the production of a beautiful drawing, a point by no means to be under-valued: but of what use is the creation of designs when unaccompanied by a knowledge of construction, by which they can be carried into effect? A picture will not shew whether the material has been well selected or judiciously employed, or if the voids and supports are properly proportioned: on the other hand, the study of the engineer is often exclusively directed to the display of mere mechanical skill, without the attempt to produce a good effect: still the demand for the ability in question is now so great, that without an increased energy on the part of the architect he will be superseded by the engineer; there is no reason why the labour of necessity or usefulness should not be embellished by taste, and a great nation has a right to expect the union of science and art, based on the severest integrity, in those to whom millions are entrusted for her improvement."

But we will not admit that the title of architect belongs to him who is confined to the exercise of the pencil, has no knowledge of construction, and cannot tell "if the voids and supports are properly proportioned." The architect is the constructor, the chief workman—director. Those who cannot direct will gradually be displaced (*are being displaced*) by those who can. Our author himself feels this. "One of the great features of the age," says he, "is the division of labour, and as the population increases, and the influence of knowledge spreads, it seems likely to be still further carried out. The province of the civil engineer at present extends over the works performed by the artificer, miner, and mechanic; he is entrusted with the direction of all that is difficult and scientific in construction, whether upon land or water, as well as designing the machinery necessary for these important purposes. This knowledge was formerly demanded of the *architect*, who in addition was required to be acquainted with the fine arts. His qualifications, according to Vitruvius, were to embrace all that could be known; and many illustrious names could be adduced to prove the requirements of the great Roman architect were fulfilled to the letter.

"To design an edifice that shall have 'Commodity, Firmness, and Delight,' or to render it both serviceable and expressive of its purpose, requires a variety of talent: and it is to be feared that the architect who confines his attention solely to that portion embraced by the fine arts, will eventually lose his power: for without studying the principles of construction, he cannot give character to his design, and is not qualified to be entrusted with the execution of a work. On the other hand, should the civil engineer be required to act as an architect, he must pursue the course adopted by Sir Christopher Wren,—set out upon his travels, and examine and study those buildings which have received the approbation of the most competent judges: and he will find that Egyptian, Grecian, Roman, and Mediæval architecture, have each its peculiar principles and character of expression."

Most truly it is to be feared that the architect who confines himself to that portion embraced by the fine arts, without studying the principles of construction, *will* lose his power; that is, if a man *can* lose what he has never had.

The fact is, the profession will be divided into two parts,—those who understand construction, and those who do not. Indeed, if all the subjects set forth in the "Encyclopædia of Civil Engineering," markets, walls, gates, theatres, baths, prisons, &c., &c., &c., belong to the Civil Engineers, this has already taken place, and *Civil Engineer* is the name the members of the first division of the profession have adopted. To them we shall have to look for the regeneration of architecture.

Our author in some places falls into the error which he elsewhere reproves, as for example at the commencement of the chapter on the "Principles of Proportion," where, for a comprehensive view of architecture, he refers the reader to the "Encyclopædia of Architecture," and says "we must confine our attention to the principles and science of building, *the more immediate province of the Civil Engineer*," an opinion from which we entirely dissent.

A writer in the *Penny Cyclopædia** defines more satisfactorily to us the province of the two professions. He says, "The profession of an architect and of an engineer, as they are practised at present, may be said to coincide with one another to a certain extent. The members of both must be able to form a judgment of the quality of the ground in which the foundations of their buildings are to be laid; they must be acquainted with the capacities of different materials, wood, stone, and iron, for resisting the strains to which such materials may be exposed, so that sufficient strength may be obtained with a due attention to economy; and they must equally attend to the principles of equilibrium in their roofs, arches, and domes, arranging the beams, bars, or voussoirs so that they may remain at rest with as little strain as possible upon the connecting ties by which the joints are strengthened. But here the two professions diverge from one another: while the engineer has to determine, by a process of levelling, the profile of the ground on perhaps an extensive line of country, for a road or a canal; or has to determine the forms and dimensions of his retaining walls, so that they may resist the pressure of earth or water against them; or, finally, to devise methods of rendering the action of his moving powers uniform, and of transmitting them through a train of machinery to the place where the effect is to be produced,—the architect is engaged in designing the external forms and internal arrangements of edifices, in which, whether intended as palaces or private dwellings, or as buildings consecrated to the service of religion or of the state, architectonic beauty must be combined with fitness for the purposes for which they are intended." Enough, however, at present, on this point.

Mr. Cresy has divided his Encyclopædia into two books, the first treating of the History of Civil Engineering (and Architecture), the second, of its Theory and Practice. The history, in eight chapters, includes Phœnician, Egyptian, Grecian, Roman, Dutch, French, American, and British works. The second book is in twenty-nine chapters, under the following heads: geology, rivers: composition and use of minerals: stone: bricks and tiles: mortar and cements: pisé: tar, glass: geometry: valuation of property: value of artificers' work in engineering: mechanics: machines: carriages for transport: piles: mechanical agents: hydrostatics: motion of fluids: supply of towns with water: warming and lighting: steam as a moving power: timber and its properties, carpentry, roofs: bridges, scaffolds: masonry: stone-bridges: fascines, sea-walls: canals, locks: draining: and construction of machinery.

In the historical portion the pyramids of Egypt and the baths of the Romans are very fully investigated. Ports in all countries are treated of at considerable length, and many examples are given. The chapter devoted to

* "An Encyclopædia of Civil Engineering, Historical, Theoretical, and Practical." By Edward Cresy, architect and civil engineer. Longman, Brown, and Co., Paternoster-row. 1847.

* Article, Engineering.

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